

**Observations on Oviposition Habits of *Sirex longicauda*
and *Urocerus californicus***

(Hymenoptera : Siricidae)

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The oviposition habits of two California siricids, *Sirex longicauda* Middlekauff and *Urocerus californicus* Norton, resemble those reported by Chrystal (1928) and Rawlings (1951) for European species. Observations of the North American siricids were made in the course of studies on insects causing degrade in lumber cut from fire-damaged and windthrown trees. Their oviposition habits have never been reported.

On 9 October 1963, a female *S. longicauda* was observed ovipositing on red fir, *Abies magnifica* A. Murr., at Summit Lake, Lassen Volcanic National Park, California. The 24-inch-diameter tree was broken off 50 feet above the ground by wind in October 1962, but was still alive. The thermograph-recorded air temperature was 9° C; there were intermittent clouds and southerly winds estimated at 5 to 15 mph.

The insect was found at 1 p.m. in a bark crevice on the sunny side of the tree, oriented head up. Almost the entire length of her ovipositor was inserted. Her abdomen pulsated rapidly in a circular motion until its tip touched the bark. She remained in this position for 5 minutes, then began struggling—evidently unable to free her ovipositor. After 10 minutes of useless struggling by the insect, an attempt was made to free the ovipositor with forceps, but the thin tube broke off, several eggs oozing from the break.

This oviposition occurred in much cooler temperature than previously reported by Rawlings, who found 26° C the optimum temperature for ovipositing, the process slowing down at 21° C. The oviposition site at Summit Lake, however, was in full sunshine; reflected and absorbed heat in the deep bark crevice was undoubtedly higher than air temperature.

Two female *U. californicus* were captured in 10° C temperature while resting on freshly cut red fir logs at Hat Creek, California, on 11 October 1963. They were caged with a small white fir, *Abies concolor* (Gord. and Glend.) Lindl., log. The log had been cut a few days earlier from a tree windthrown in October 1962. It had a moisture content of 52 per cent. A wire cage with glass door was placed in the laboratory.

A bank of fluorescent lights above and to one side of the cage allowed one side of the standing log to be shaded. The room temperature was kept at 25° C with an electric space heater, and relative humidity was about 70 per cent for 2 hours, with no oviposition taking place.

Shortly after the temperature was lowered to 20° C, both insects began ovipositing. They drilled oviposition holes repeatedly throughout the day, often alternating oviposition with several minutes' flight against the glass window. In all observed instances except two, the oviposition took place with the head oriented upward. In one of the exceptions, the body was oriented horizontally on the log; in the other, the head was downward. There seemed to be no preference shown for the shady or well-lit side of the log.

The insects continued ovipositing at a diminishing rate the second day on a fresh ponderosa pine, *Pinus ponderosa* Laws., log inserted in the cage. On the third day both insects were moribund.

During all observations the insects explored possible sites, especially bark crevices, with their antennae, then probed with their ovipositor and sheath, usually several times, before finding the drilling spot. Then the female arched her abdomen, placing her weight on the ovipositor sheath and on the prothoracic and mesothoracic legs. When she was firmly in place, the valves of the sheath returned to their original horizontal position and she inserted the thin, tube-like ovipositor in a rapid circular motion accompanied by a rhythmic pulsation of her abdomen.

One individual continually oviposited as deeply as her ovipositor would allow (20 mm); the entire operation consistently took about 10 minutes: 5 minutes for insertion, 2 minutes for egg laying, and 2 to 3 minutes for withdrawal. Some eggs were probably laid during withdrawal.

The other insect was less consistent, several times inserting her ovipositor (26 mm long) only 5 to 10 mm in a 5-minute operation. Whether she laid eggs or not could not be determined.

Chrystal found that *S. gigas* L. took 8 to 9 minutes to oviposit, and laid three to six eggs in each tunnel, several as the ovipositor was withdrawn. Both Chrystal and Rawlings reported that sometimes no eggs were laid in an oviposition tunnel. Rawlings attributed this habit to the siricid female's aversion to resin ducts. The insect withdrew immediately upon encountering a resin duct.

Oviposition habits of the two California species were very similar to those reported for European species except for the surprising temperature relationships. The two cases observed indicated that California siricids can oviposit at lower temperatures than expected. This dif-

ference might be partially explained by the sudden cold period which interrupted an attacking siricid population in October 1963.

LITERATURE CITED

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